

### REMARKS

Claims 1, 2, 4-6, 9-15 and 44-48 are pending in this application. In the Office Action dated September 17, 2004, the Examiner took the following action: (1) withdrew claims 3, 7, 8, 16-43, and 49-76 as being drawn to a non-elected species; (2) rejected claim 9 under 35 U.S.C. § 112, first paragraph, as failing to comply with the enablement requirement; (3) rejected claim 9 under 35 U.S.C. § 112, second paragraph, as failing to point out and distinctly claim the subject matter; (4) rejected claims 1-2, 4-6 and 10 under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent No. 6,315,857 to Cheng et al. (the "Cheng reference"); (5) rejected claim 9 under 35 U.S.C. § 103(a) as being unpatentable over Cheng; (6) rejected claims 13-15 under 35 U.S.C. § 103(a) as being unpatentable over Cheng in view of U.S. Patent No. 5,718,618 to Guckel et al. (the "Guckel reference"); and (7) rejected claims 11 and 44-48 under 35 U.S.C. § 103(a) as being unpatentable over the Cheng reference in view of U.S. Patent No. 5,912,184 to Young (the "Young reference").

In response to the rejections, Applicant has amended claims 1, 5 and 44 in order to further distinguish the claims from the cited references. Applicant has canceled claims 4, 9 and 47. Applicant has also amended the specification, by replacing the paragraph on page 12, beginning at line 6, to be consistent with Figure 5 of the present application. No new matter has been introduced. Reconsideration is therefore requested in light of the present amendments and following remarks.

The disclosed embodiments will now be discussed in comparison to the cited references. It is understood, however, that the following discussion of the disclosed embodiments, as well as the discussion of the differences between the disclosed embodiments and the cited references do not define the scope or interpretation of any of the claims. Instead, such discussed differences are offered merely to help the Examiner appreciate important claim distinctions as they are discussed.

The present invention generally relates to an apparatus to planarize a microelectronic substrate. As described by embodiments of the present invention, the apparatus generally includes a platen having a support surface that is oriented at a non-horizontal angle, a non-continuous polishing pad adjacent to the support surface of the platen with a planarizing

surface that is also oriented at a non-horizontal angle, and a carrier located proximate to the planarizing surface for biasing the microelectronic substrate against the polishing pad. The polishing pad can be an elongated web-format type polishing pad that extends from a supply roll to a take-up roll. The apparatus further includes a frame, a supply spindle coupled to the frame and positioned to receive the polishing pad, and a take-up spindle coupled to the frame and spaced apart from the supply spindle. The supply spindle is positioned above the take-up spindle, and the take-up spindle is positioned to receive a used portion of the polishing pad. The platen is coupled to the frame and positioned proximate to the supply spindle and the take-up spindle. The platen can be oriented vertically or at other non-horizontal angles to promote the flow of planarizing fluid and suspended particulate material from the polishing pad.

An advantageous aspect of an inclined platen and polishing pad is that the apparatus can have a smaller planform outline, or "footprint", so that the apparatus occupies generally less floor space when compared to conventional planarizing machines. This aspect thus allows a greater number of machines to be positioned within a given floor area.

The Examiner has cited the Cheng reference. The Cheng reference discloses grooving patterns for polishing pads in a Chemical Mechanical Polishing (CMP) apparatus. Referring to Figures 1a and 1b of the Cheng reference, the CMP apparatus includes a continuous polishing belt configured to polish semiconductor wafers. The Cheng reference does not disclose a supply spindle that is placed above a take-up spindle, as acknowledged by the Examiner in paragraph 11 of the Office Action.

The Guckel reference has also been cited by the Examiner. The Guckel reference discloses a lapping and polishing method and apparatus to form a multilevel metal microstructure. The Guckel reference fails to disclose or fairly suggest a non-continuous polishing pad, and the Guckel reference does not disclose a supply spindle and a take-up spindle.

The Examiner has also cited the Young reference for disclosing an enclosure for managing environmental conditions during a CMP process. The enclosure includes an air flow management system, a valve control for balancing air supply and exhaust, and controls to regulate temperature, relative humidity and dew point. The Young reference fails to disclose or fairly suggest an enclosure capable of retaining *a planarizing medium having a planarizing surface being oriented at a non-zero angle relative to horizontal.*

Turning now to the claims, differences between the claim language and the applied art will be specifically pointed out.

The Examiner rejected claim 9 under 35 U.S.C. 112 as failing to comply with the enablement requirement and as being indefinite. Claim 9 recites, "The apparatus of claim 5 wherein the supply spindle is positioned above the take-up spindle." The Examiner said that there is no disclosure as to the position of the spindles other than in the figures.

Applicant has canceled claim 9, and has amended claims 1 and 5 by adding the limitations of claim 9 to claims 1 and 5. In addition, Applicant has amended the specification on page 12, line 13 by inserting the following: "The supply spindles 225 are positioned above the take-up spindles 226." Figure 5 of the present application shows that the supply spindles 225 are positioned above the take-up spindles 226. Thus, the amendment to the specification is consistent with Figure 5 and does not introduce any new matter.

The Examiner rejected claim 1 under 35 U.S.C. 102(e) as being anticipated by the Cheng reference. Claim 1, as amended, recites in pertinent part: "An apparatus for planarizing a microelectronic substrate, comprising:...*a non-continuous polishing pad* adjacent to the support surface of the platen and having a planarizing surface offset from horizontal and generally parallel to the support surface of the platen during operation; a frame; a supply spindle coupled to the frame and positioned to receive the polishing pad; a take-up spindle coupled to the frame and spaced apart from the supply spindle, *the supply spindle being positioned above the take-up spindle*, the take-up spindle being positioned to receive a used portion of the polishing pad, the platen being coupled to the frame and positioned proximate to the supply spindle and the take-up spindle.

As discussed above, the Examiner acknowledged in paragraph 11 of the Office Action that the Cheng reference does not disclose that the supply spindle is placed above the take-up spindle. Claim 1 is therefore allowable over the Cheng reference. Claims 2-4 depend from claim 1 and are also allowable based upon the allowable form of the base claim and further in view of the additional limitations recited in the dependent claims.

The Examiner rejected claim 5 under 35 U.S.C. 102(e) as being anticipated by the Cheng reference. In response, Applicant has amended claim 5 by adding the limitation: "the supply spindle being positioned above the take-up spindle." Applicant submit claim 5 is now

allowable in view of the amendment and also in view of the foregoing reasons presented in support of the allowability of claim 1 over the Cheng reference. Claims that depend from claim 5 and are also allowable based upon the allowable form of the base claim and further in view of the additional limitations recited in the dependent claims.

The Examiner rejected claim 9 under 35 U.S.C. 103(a) as being unpatentable over the Cheng reference. Although in paragraph 11 of the Office Action the Examiner said that the Cheng reference does not disclose that the supply spindle is placed above the take-up spindle, the Examiner based this rejection on the alleged ground that Applicant has not disclosed that a critical function is met by placing the supply spindle above the take-up spindle.

Applicant submits that the advantages of placing the supply spindle above the take-up spindle are generally discussed in line 11, page 9 through line 20, page 10 of the Detailed Description section of the present application. An advantage of placing the supply spindle above the take-up spindle is that the polishing pad can be inclined relative to the horizontal, causing the planarizing liquid that entrains particulates to run off the polishing pad under the force of gravity. An additional advantage of this feature is that the particulates are less likely to scratch or otherwise damage the substrate because they are quickly removed from the non-continuous polishing pad. An additional advantage of this feature is that the apparatus can have a smaller planform outline "foot print" and thus takes up less floor space than conventional machines. Accordingly, Applicant requests the withdrawal of the rejection of claim 9.

The Examiner rejected claims 13-15 under 35 U.S.C. 103(a) as being unpatentable over the Cheng reference in view of the Guckel reference. Claim 13 depends from claim 5, and claims 14 and 15 depend from claim 13. Since claim 5 is allowable for the reasons presented above, claims 13-15 are also allowable.

The Examiner rejected claims 44-48 under 35 U.S.C. 103(a) as being unpatentable over the Cheng reference in view of the Young reference.

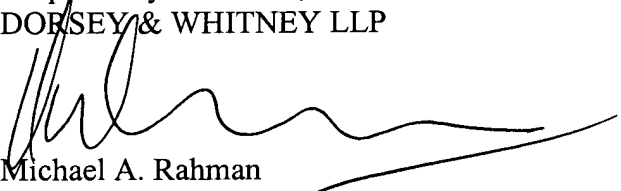
Claim 44, as amended, recites in pertinent part "An apparatus for planarizing a microelectronic substrate, comprising: platen having a support surface for supporting a planarizing medium; a planarizing medium supported by the support surface of the platen, the planarizing medium having a planarizing surface opposite the support surface for engaging the microelectronic substrate, *the planarizing surface of the planarizing medium being oriented at a*

*non-zero angle relative to horizontal*;....an at least partially gas-tight enclosure around the carrier and the planarizing medium, the enclosure having an entrance port for admitting ventilating gas to the enclosure and an exit port for removing the ventilating gas from the enclosure, at least one of the entrance port and the exit port being coupleable to a gas propulsion device for moving the ventilating gas relative to the enclosure....

The Young reference fails to disclose or fairly suggest an enclosure capable of retaining a planarizing medium having a planarizing surface oriented at a non-zero angle relative to horizontal. A review of all of the enclosures illustrated in Figures 1-6 of the Young reference clearly show that there is no disclosed mechanism that would permit the retaining of a planarizing surface oriented at a non-zero angle. The Cheng reference does not disclose or suggest an enclosure. Accordingly, claim 44 is allowable over the Cheng reference in view of the Young reference. Claims 45-48 depend from claim 44, and they are also allowable based upon the allowability of the base claim and further in view of the additional limitations in the dependent claims.

All of the claims remaining in the application are now clearly allowable. Favorable consideration and a timely Notice of Allowance are earnestly solicited.

Respectfully submitted,  
DORSEY & WHITNEY LLP



Michael A. Rahman  
Registration No. 43,872  
Telephone No. (206) 903-8813

MAR:dms

Enclosures:

Postcard

Check

Fee Transmittal Sheet (+copy)

DORSEY & WHITNEY LLP

1420 Fifth Avenue, Suite 3400

Seattle, WA 98101-4010

(206) 903-8800 (telephone)

(206) 903-8820 (fax)

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